Colorado Department of Health

Review and Comment

Technical Memorandum #6, Public Health Risk Assessment,
Exposure Scenarios; OU 1
January, 1992

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General Comments:

1) On page 1 of the IAG Statement of Work, the text cites many guidance documents with which response actions at RFP will be consistent. One of the cited references is the Federal Register, Volume 52, Number 53, Thursday, March 19, 1987, pp. 8704 - 8709 which amends the regulations for closure of hazardous waste surface impoundments. The Division applies the concepts outlined in this Federal Register as corrective action performance standards in addition to closure performance standards. At several points within this Federal Register, it is stated that owners and operators must evaluate whether a threat to human health or the environment exists from direct exposure to hazardous media at a facility. Direct exposure is further defined to be exposure at or within the unit boundary to all routes of exposure (ingestion, inhalation, and dermal contact) from any media. This Federal Register also states that no attenuation of the hazardous constituents can be assumed to occur before the constituents reach exposure points; arguments relying on fate and transport calculations will not be accepted.

In addition, Section VII.D.1.b of the IAG (the location of the technical requirements for Technical Memorandum 6) states that DOE shall identify actual and potential exposure points and pathways and include an evaluation of risk at the source.

A risk assessment is applicable for several activities under RCRA. These include "Closure" of any regulated unit, hazardous waste determinations for investigation derived material (utilizing the "contained-in" policy), and corrective action. Implementation of the risk assessment has been applied by the Division as follows:

a) Materials that have been analytically determined to contain amounts of listed hazardous waste and/or hazardous constituents that exceed either a $1X10^{-6}$ carcinogenic risk or an Rfd hazard quotient of 1.0 present an unacceptable risk to

human health and the environment and must be managed, controlled, or remedied appropriately.

b) Risk is calculated by assuming direct exposure (defined above) to a range of receptors, but must at least include the most sensitive receptor - a resident, on-site (at the source), child. Ingestion, inhalation, and dermal contact must each be evaluated. The total risk to a receptor would then be the sum of the risks for each chemical constituent considered in each pathway from each media.

c) Corrective Action Decisions (CADs) are then based on several factors, one of which is risk management. Risk management considers the range of exposure scenarios from various future land uses and/or remedies that could occur at the site, but must have, as one end point, the worst-case, most conservative, risk assessment (as outlined in (b) above) as the baseline.

Therefore, the Division will not accept the risk assessment scenarios presented in this technical memorandum as complete. Future on-site residential use must be quantitatively considered. Furthermore, the purpose of Appendix B, though not clear in the text, is a moot issue since direct exposure to ground water ingestion is specifically called for in the above referenced Federal Register for complete risk evaluation.

Specific Comments:

Section 3.5, Page 28: In the third paragraph on page 28, there is a discussion about the monitoring wells completed in the Arapahoe formation at RFP. The text states that "these (Arapahoe) wells are routinely bailed dry during normal sampling activities and may require several days to recover." This statement implies that all wells completed in the Arapahoe, throughout the entire plant-site, are bailed dry. This is a very broad statement considering there is no supporting information on screened intervals, screened interval lithology, or location of the wells. The Division can not accept this type of statement unless supporting information is included.

Additionally, later in the same paragraph, Standley Lake is suggested as a potentially large source of recharge for the off-site water supply wells completed in the Upper Laramie Formation. It is further stated that the Upper Laramie is composed of claystones and thin, discontinuous sandstone lenses (this is supported by Figure B-1). Somewhere in this discussion, the Division has missed the logic. If both the Arapahoe and Laramie formations are characterized by thin, discontinuous sandstone lenses in a claystone matrix which, by definition, has low hydraulic conductivity and slow recharge rates, why are the off-site wells capable of much larger water deliveries than the on-site wells? Unless the Upper Laramie is fractured, the presence or

absence of Standley Lake would not affect off-site well deliveries. The only factor we can identify that may play a role is screen depth, but this is not mentioned in the text. Please expand the text to more completely explain these inconsistencies.

Section 3.5, pages 28 and 29: The last paragraph on page 28 presents DOE's ranking of the possible future uses for land surrounding the production area. It is stated in the text that consideration was given to the growth pressures of planned off-site developments. Again, we have trouble understanding the conclusions drawn. If the off-site growth pressures become strong, on-site development pressures will also increase. The result would seem to be that residential use would at least become "plausible", if not "credible", and ecological reserve use would become less probable, maybe decreasing to "plausible". The buffer zone is a very large area which could easily be developed in a combination of uses.

Section 3.5, page 29: Please clarify how the residential land use risk will be "compared" to risks associated with other uses.

Appendix B:

General Comments:

1) It is unclear to the Division how this appendix relates back to the text of the Technical Memorandum. Is Appendix B an effort to establish a technical justification for removing the ground water on the 881 Hillside from future consideration as a drinking water source? Or is the appendix a larger-scope effort by DOE to support the deletion of the future on-site residential use scenario? We have reviewed the appendix as the first alternative presented above. The second choice (future on-site residential use) must be considered regardless of the water supply as outlined previously.

Specific Comments:

Page B-1: The text builds a case for dewatering the alluvium and bedrock by assuming that an average family of four needs 200 gpd/person, or 800 gpd. The Division has the following problems with this assumption:

a) The State Engineer's office has established no lower water production limit as a water supply well permitting requirement.

b) The Water Quality Control Division uses a figure of 60 gpd/person as a reasonable figure for domestic water use. Anything above that figure is assumed to be for lawn watering.

c) Many locations within Colorado have established viable domestic ground water supplies at pumping rates of even less than 60 gpd/person.

d) The text admits that 800 gpd is an average, not a minimum.

e) Even at 800 gpd, sufficient storage would accumulate this amount at a pumping rate of slightly over 1/2 gpm over a 24 hour period.

Page B-3: The second bullet on this page states that the Arapahoe sandstone units beneath OU 1 are known to be of limited extent. How is this known? Only one of the two depositional models presented in the Site-wide Geologic Characterization presents the lenticular, disconnected sand bodies mentioned here. If there are still two viable models, then the extent of the sands is not known.

Page B-5: The bulleted item at the top of this page again mentions that the Arapahoe wells are routinely bailed dry. Please see our previous comment regarding this matter.

Page B-6, Table B-3: The pumping rate parameter presented in this table is incorrect. If it is assumed that 800 gpd is the necessary rate of water delivery, this equates to approximately 3.0 m^3/d, as indicated in the first line of the table. However, 800 gpd, which is also equivalent to the figure of 1.5 gpm for 9 hours presented on the second line of the table, is not equivalent to 3.7 m^3/hr, also shown on the second line. This is a significant error in terms of the modeling result. If 3.7 m^3/hr is used to model aquifer response, it demands that the aquifer deliver more volume in one hour than is required in 24 hours and requires this delivery rate for nine continuous hours. This results in significantly faster dewatering of the aquifer. Please correct this model input.

Page B-8: Regarding the first paragraph on this page, many residential communities are served by both a municipal water supply and water wells. Usually, because the municipal water supply is very reliable and safe, the water wells are used for lawn and garden irrigation. This type of scenario could develop in residential developments on RFP and needs to be considered. Wells that do not act as a sole source of water supply for a residence would not have to deliver the 800 gpd volume stated on page B-17.